

# What About ISO 50001?

## Energy Management Systems or EnMS

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# Agenda

- Status of ISO 50001
- Requirements of ISO 50001
- Energy Reduction Calculation Approaches
- Tools and Techniques for EnMS

## Benefits of an ISO 50001 EnMS

- Aggressive Goals / Performance Requirements – Should drive Energy use / costs down
- ISO 50001 Certification will indicate your company is Sustainable and **GREEN**
- May be able to use energy performance data and action plan results for other similar reporting tasks (i.e., Green House Gas reporting, ISO 14001, CDP\*, etc.)
- DOE Energy Footprint spreadsheet is comprehensive allowing you to track energy both facility wide and by Department

\* CDP = Carbon Disclosure Project

# International Standard ISO 50001



# Other ISO Management Systems Certifications for Sustainability

- ISO 9001 / AS 9100 / IATF 16949 – Quality
- ISO 14001 – Environmental
- ~~OHSAS 18001~~ / ISO 45001 – Safety
- ISO 26000 – Social Responsibility
- ISO 50001 – Energy
- Others

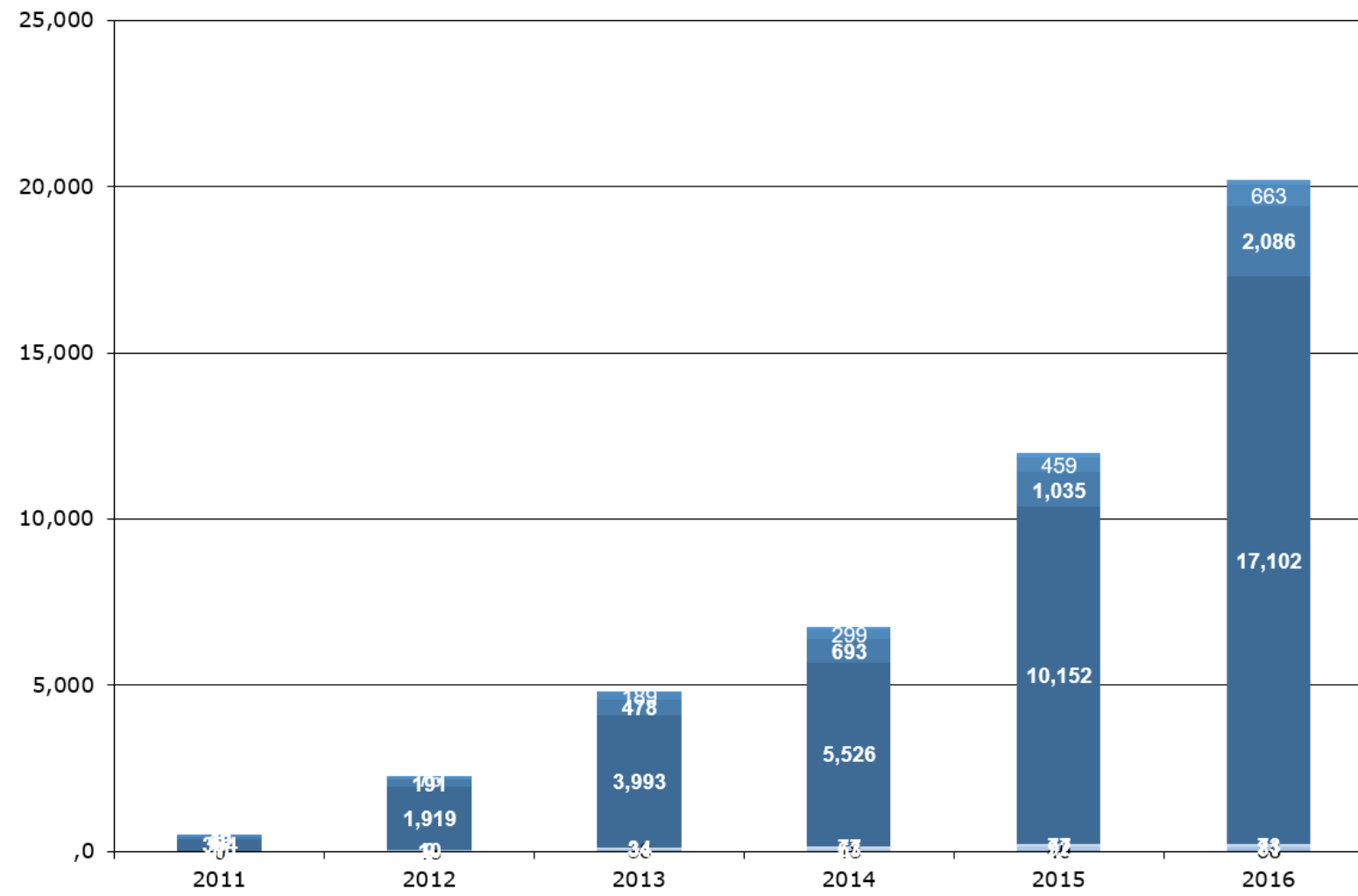
# GHG vs ISO 50001

- What is the difference between GHG (GreenHouse Gas Emissions / Carbon footprint) and ISO 50001 (Energy Management System)?

<b>GHG Emissions</b>	<b>ISO 50001</b>
Metrics = Metric tons CO2e/yr emissions	Metrics = MMBtu/yr, Kwh/yr, etc.
Sources = May Include CFC (Refrigerants) Emissions	Sources = only energy using equipment (not refrigerants)
Scope = Defined as 1, 2 or 3 (Scope 3 may include off-site energy users, Commuters, Product Life Cycle GHGs, etc)	Scope = Defined in EnMS Manual
	Sources ≠ Small Energy Equipment (if < 5% total as SEP)

# How Popular is this Standard?

Approx. 20,000 organizations certified to ISO 50001 by 2016



# ISO 50001 Certifications by Continent

## *ISO 50001 - Certifications by Area*

<b>Year</b>	<b>2011</b>	<b>2012</b>	<b>2013</b>	<b>2014</b>	<b>2015</b>	<b>2016</b>
Africa	-	13	36	18	40	58
Central South America	11	10	34	63	92	81
North America	1	9	34	77	77	73
(USA)	1	6	22	52	53	47
East Asia / Pacific	49	191	478	693	1,035	2,086
Central / South East Asia	26	76	189	299	459	663
Europe	364	1,919	3,993	5,526	10,152	17,102
Middle East	8	18	62	89	130	153

- **85% of organizations certified to ISO 50001 are European**
- **8.6% are East Asia/Pacific**



# Why Consider Getting Certified to ISO 50001?

- Aggressive Goals/Performance Requirements – Should drive Energy use/costs down
- ISO 50001 Certification will indicate your company is Sustainable and **GREEN**
- May be able to use energy performance data and action plan results for other similar reporting tasks (i.e., Green House Gas reporting, ISO 14001 Objectives, Sustainability Initiatives, etc.)

# Regulatory Driver for ISO 50001 Certification

The “Boiler MACT” Air Emissions Rule for Hazardous Air Pollutants (HAPs) requires:

- Boiler tune ups {[63.11201](#)}
- **Facility energy assessments** {63.11201- Table 2}

## UNLESS

- ... facility that operates under an energy management program established through **energy management systems compatible with ISO 50001**, .... , also satisfies the **energy assessment** requirement.

# In General, what does ISO 50001 require?

## 1: Identify SEUs\*

- Energy Hogs (Big Energy Using Equipment / Systems).
- Track Energy Usage (sub-meter) for SEUs
- Establish Controls and Competencies doe SEUs
- Other requirements for SEUs

## 2: Facility Wide Energy Reductions

- i.e., 3% by 2020 in Energy Intensity

\* SEU = Significant Energy Users

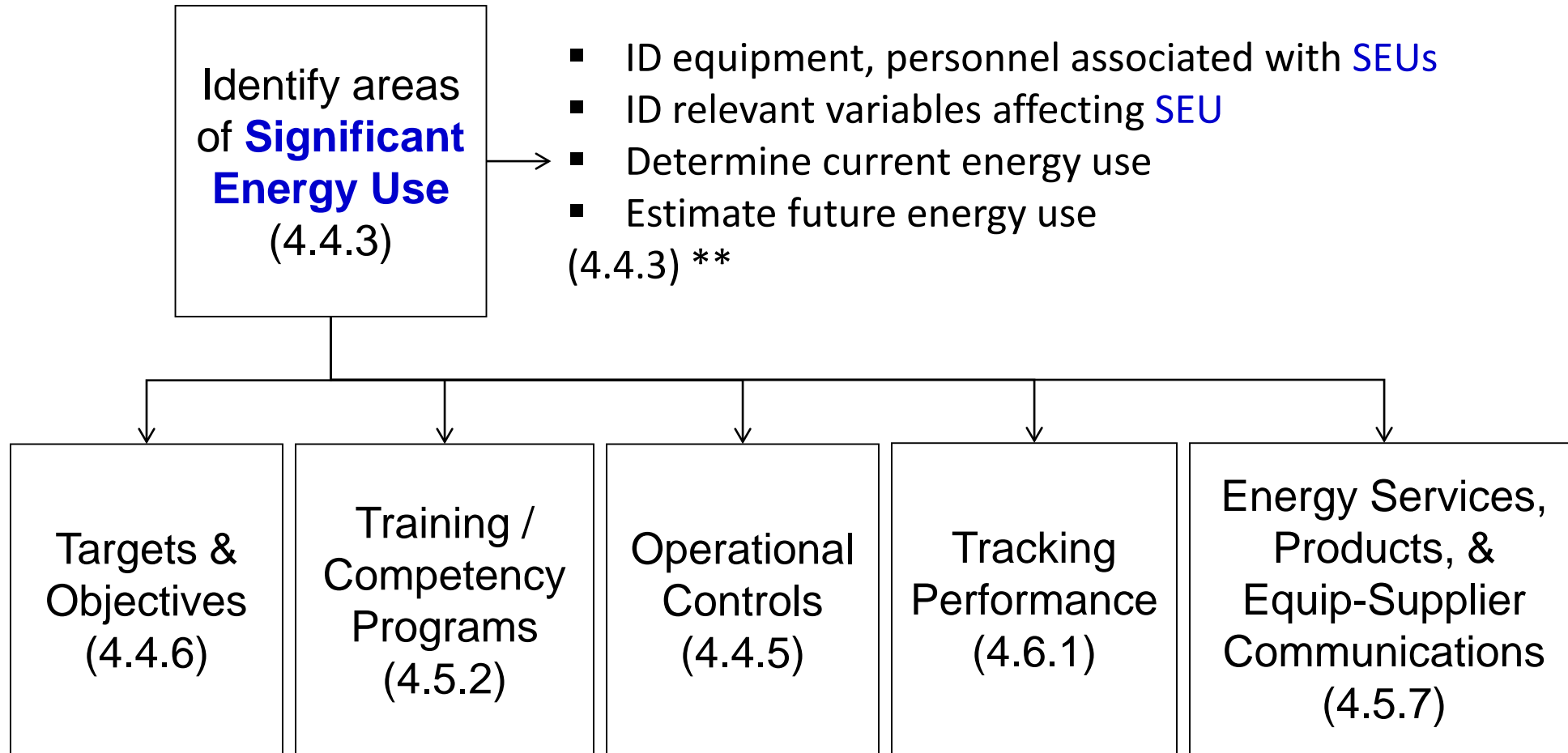
## 4.4.3 Energy Review – SEUs

“... based on **energy use** and **consumption**, identify the areas of “Significant Energy Use ...”

Where	Utility	Energy Use	ROI	Cap Invest	MMBtu Savings	TOTAL	SEU?
Preparation	Fuel	4	1	4	4	13	SEU
Mixing	Elec.	4	1	2	4	11	SEU
Plant Air Conditioning	Elec	3	4	4	4	15	SEU
Powerhouse	Elec	3	3	2	2	10	
Final Assembly	Elec	3	2	2	2	9	
Shipping	Elec	3	1	2	2	8	
Coating	Elec	3	1	2	2	8	

SEU = Significant Energy Users

# Requirements for SEUs



\*\* 4.4.3 = Energy Review

# Potential Trouble Spots with SEUs

How do you track “Energy Use” at an SEU?

- Monitor Energy Use in Areas – Using Sub-meters (i.e., “Boiler #1” Energy Use)  
  
**or**
- Calculate Energy Use in Areas - Using proven relationships, etc. (**THIS MAY NOT BE ACCEPTABLE**)

# ISO 50001:2011

## ISO 50001 Requirements

### 4.1 General

### 4.2 Management Responsibility

- 4.2.1 Top Management
- 4.2.2 Management Representative

### 4.3 Energy Policy

### 4.4 Energy Planning

- 4.4.1 General
- 4.4.2 Legal and Other Requirements**
- 4.4.3 Energy Review**
- 4.4.4 Energy Baseline**
- 4.4.5 Energy Performance Indicators**
- 4.4.6 Energy objectives, energy targets and energy management action plans**

## Continual Improvement

### 4.5 Implementation & Operation

- 4.5.1 General
- 4.5.2 Competence, Training and awareness**
- 4.5.3 Communication
- 4.5.4 Documentation (Doc Req'ts and Doc Control)
- 4.5.5 Operational Control**
- 4.5.6 Design**
- 4.5.7 Procurement of Energy Services, products, equipment and energy**

### 4.7 Management Review

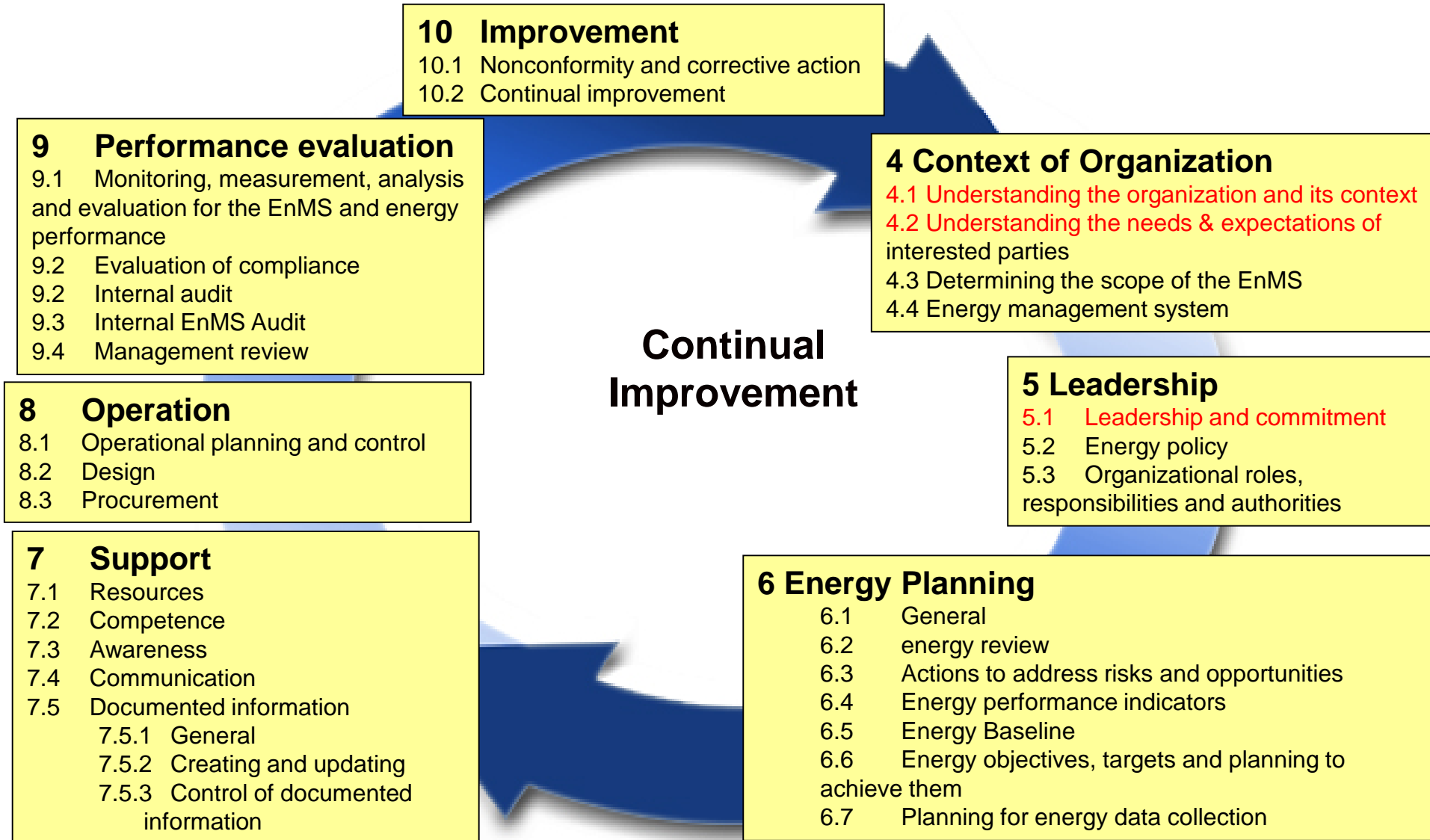
- 4.7.1 General
- 4.7.2 Input to Management Review
- 4.7.3 Outputs from Management Review

### 4.6 Checking

- 4.6.1 Monitoring, measurement and analysis
- 4.6.2 Evaluation of Legal and Other Compliance**
- 4.6.3 Internal Audit of the EnMS
- 4.6.4 Non conformities, correction, corrective and preventive action
- 4.6.5 Control of Records

**Red = Identifying Energy Issues**  
**Blue = Managing Energy Issues**

# ISO 50001–2018 (Proposed)





# ISO 50001 Documents and Records (1 of 3)

## ISO 50001 Requirements

Element	Procedures	Other Documents	Records	Implied Records	Other Evidence Needed
4.1 General		- Scope & boundaries *			
4.2 Management Responsibility ***					
4.2.1 Top management					- Policy Approval / Defined - Management Rep Appointment - Other req'ts covered throughout the standard (d-j)
4.2.2 Management representative				- EnMS responsibilities & authorities	- Other req'ts covered throughout the standard (a-e, g-h)
4.3 Energy policy				- Energy Policy	- Communication of Policy to organization
4.4 Energy Planning					
4.2.1 General **	- Energy Planning Process - (same as Energy Review Process ??)				
4.4.2 Legal and other requirements				(Legal / Other Req'ts) (3)	- periodic reviews of L/O req'ts
4.4.3 Energy review	Energy Review Method		Energy Review (including items in next column)	- (Current Energy Sources) - (Areas of Significant Energy Users) (4) - [Past and Present Energy Use] - [Future Energy Use] - ( Relevant Variables Affecting SEU) - (Opportunities for Improvement)	
4.4.4 Energy baseline			Energy Baseline		
4.4.5 Energy performance indicators	EnPI Review Methodology			(Energy Performance Indicators)	
4.4.6 Energy objectives, energy targets and energy management action plans		- Energy Objectives and Targets* - Energy Action Plans (**)			

See slides at end of presentation

# Methods for Demonstrating Energy Reduction

Identify the \* **EnPI** (Energy Intensity Parameter):

- Simple Ratio
- **or**
- Regression Predicted Parameter

\* **EnPI = Energy Performance Indicator**

# ENERGY REDUCTIONS: Using a Ratio

$$[\mathbf{EnPI}] = \frac{MMBtu/yr}{lb\ widget / yr} = MMBtu / lb\ widget$$

## EXAMPLES

1. MMBtu / sq. ft
2. MMBtu / employee
3. MMBtu / lb meat produced (Activity Energy Intensity)
4. MMBtu / \$1000 Revenue (Financial Energy Intensity)

# ENERGY REDUCTIONS: Using a Regression

1) **Develop** a Regression ( $Y = mX + b$ ) for baseline year

i.e., 2009 Elec vs CDD (weather)

2) **Predict** Elec for current year (i.e., 2010)

3) **Compare** **Actual Electricity Used in 2010** vs **Predicted Electricity for 2010**

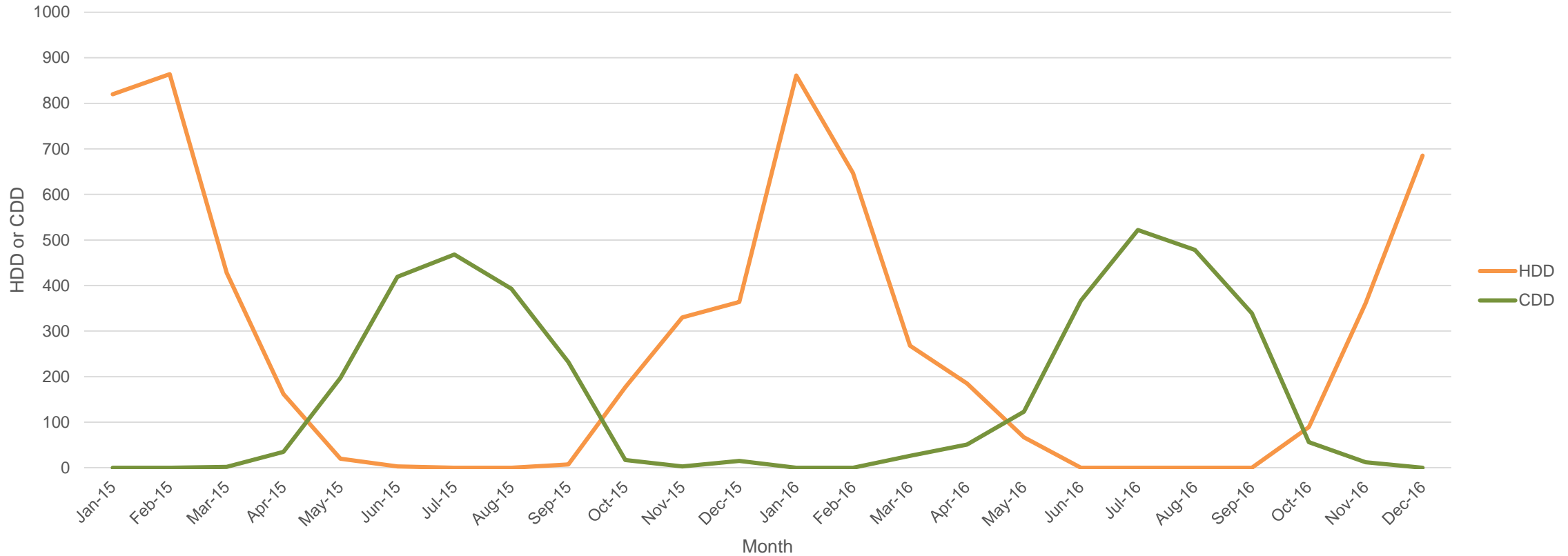
$$\text{Elec Reduction} = \left( 1 - \frac{MMBtu_{ACTUAL2010}}{MMBtu_{PREDICTED2010}} \right)$$

4) **Conduct** a separate regression for Fossil Fuels (Nat'l Gas, etc.)

(This is the basis of the **EnPI** Spreadsheet Tool offered by DOE )

# Weather Data mirrors Energy Use – HDD for Natl gas and CDD for Elec

Energy Reduction Calculations



# Regression – Weather (HDD) vs Natl Gas Use

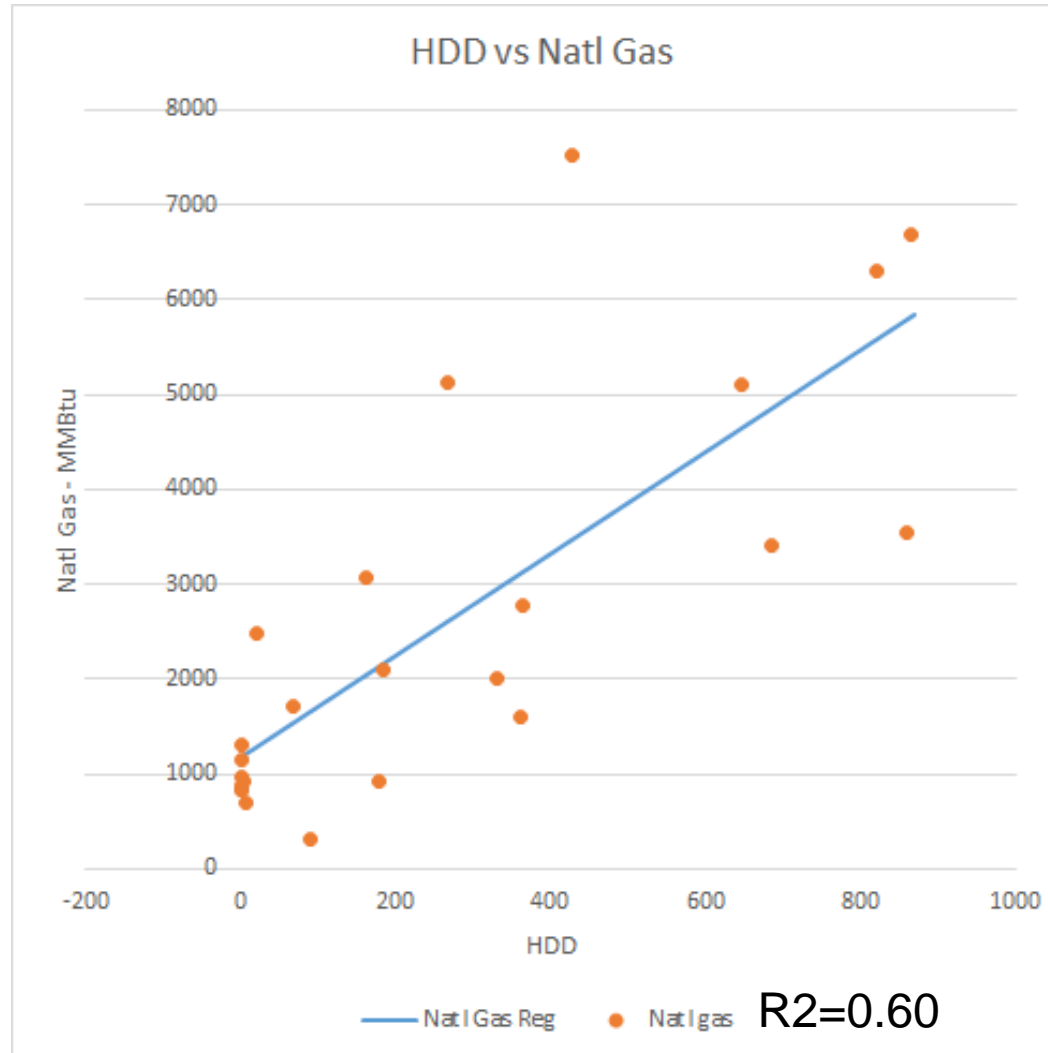
## Req'd SEP Validity Stats

F-Test p-value , 0.1

All variable p-value < 0.2

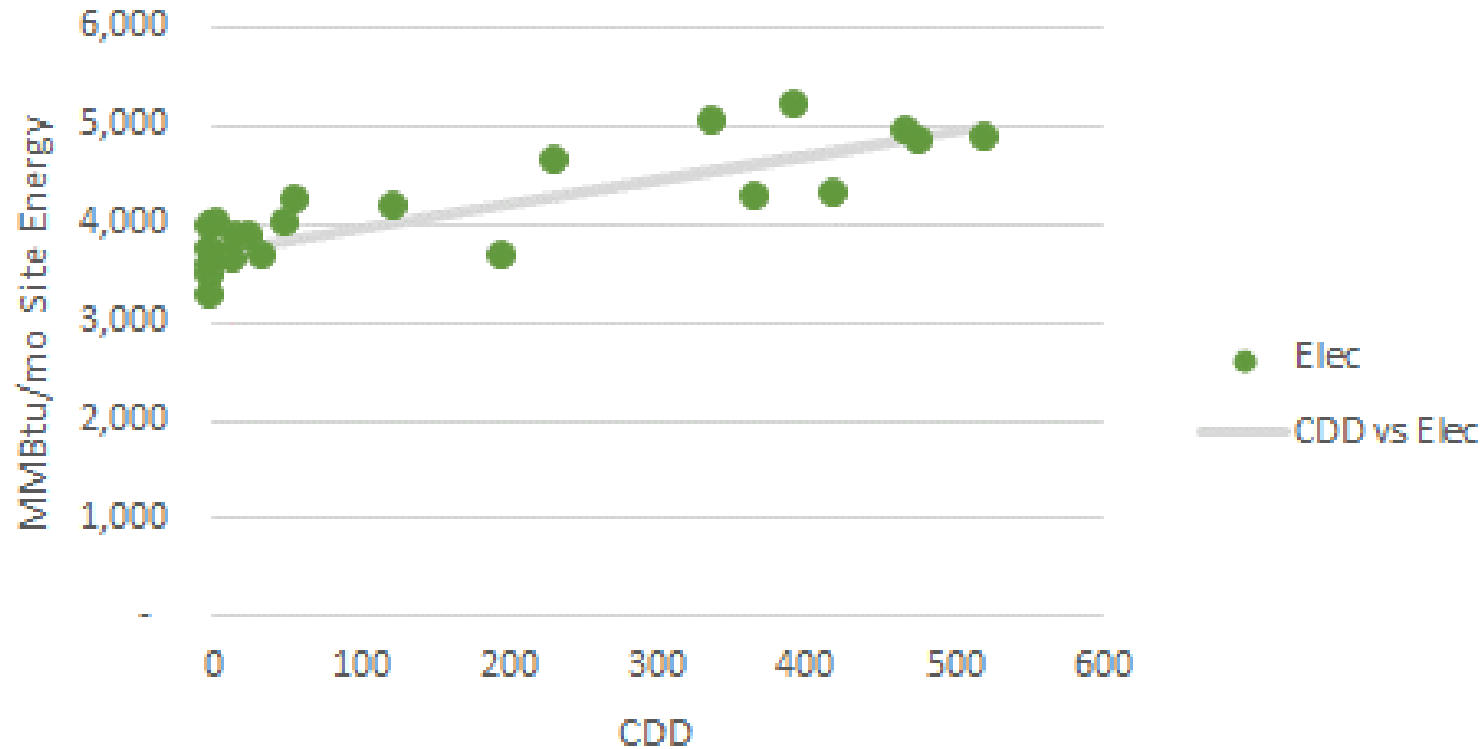
At least 1 variable p-value < 0.1

$R^2 > 0.5$



# Regression – CDD (Weather) vs Electrical Use

Energy Reduction Calculations



# The SEP EnPI Spreadsheet Tool

Energy Reduction Calculations

The screenshot shows the Microsoft Excel ribbon for the 'EnPI' tool. The 'DESIGN' tab is active, showing options like 'EnPI Step-by-step Wizard', 'Convert Units', 'Label Reporting Period', 'Use Actual Data', 'Use Regression', 'Change Models', 'Corporate Roll Up', and 'About EnPI'. Below the ribbon is a toolbar with icons for saving, undo, redo, and a formula bar showing 'Date' in cell A1. The main data table is as follows:

	A	B	C	D	E	F	G	H
1	Date	Electricity (kWh)	Natural Gas (SCF)	Production	Building Sq Ft	HDD	CDD	
2	4/1/2006	131,624.72	43987	14660	10,000	391.5	2	
3	5/1/2006	145,883.47	58343	17852	10,000	191.5	72.5	
4	6/1/2006	148,657.43	54624	17728	10,000	17	157	
5	7/1/2006	103,752.10	16399	4226	10,000	24	344	
6	8/1/2006	158,576.11	35738	18665	10,000	0	265	
7	9/1/2006	124,050.08	27210	12217	10,000	99.5	35	
8	10/1/2006	128,973.60	31936	13839	10,000	465	3	
9	11/1/2006	108,133.10	30525	8770	10,000	650.5	0	
10	12/1/2006	113,455.82	33265	5718	10,000	836.5	0	
11	1/1/2007	135,278.98	40256	12533	10,000	1096.5	0	
12	2/1/2007	125,943.74	42867	12477	10,000	858.5	0	

Use Version 5+

**NOTE: There are other methods of calculating Energy Reductions**

<https://www.energy.gov/eere/amo/downloads/enpiv515setup64bit>



# Pursue ISO 50001 or ISO 50001 AND SEP?

Another Decision – Pursue ISO 50001 or ISO 50001 AND SEP?

- **ISO 50001:2011**

or

- **ISO 50001:2011 & DOE's SUPERIOR ENERGY PERFORMANCE (SEP)**
  - SEP 2012
  - SEP 2017
  - SEP 2018

<https://www.energy.gov/eere/amo/superior-energy-performance>

# SEP – 2012 - Energy Reduction Requirements

Performance Characteristics		Silver	Gold	Platinum
EI Pathway	Energy Intensity Improvement	Meets 5% energy intensity improvement threshold over the last 3 years.	Meets 10% energy intensity improvement threshold over the last 3 years.	Meets 15% energy intensity improvement threshold over the last 3 years.
	Energy Intensity Improvement	Demonstrates an energy intensity improvement of 15% or more over the last 10 years.	Demonstrates an energy intensity improvement of 15% or more over the last 10 years.	Demonstrates an energy intensity improvement of 15% or more over the last 10 years.
Mature Energy Pathway	Score on Best Practices Scorecard	<ul style="list-style-type: none"> <li>Meets a score of <b>at least 35 and up to 60</b> out of 100 total points for Best Practices Scorecard</li> <li>Minimum of 25 points required for the energy management best practices.</li> </ul>	<ul style="list-style-type: none"> <li>Meets a score of <b>at least 61 and up to 80</b> out of 100 total points for Best Practices Scorecard</li> <li>Minimum of 25 points required for the energy management best practices and 10 for energy performance.</li> </ul>	<ul style="list-style-type: none"> <li>Meets a score of <b>at least 81</b> out of 100 total points for Best Practices Scorecard</li> <li>Minimum of 25 points required for the energy management best practices and 10 for energy performance.</li> </ul>
	<i>Includes credits for energy management best practices and energy performance beyond the 15% EI improvement over the last 10 years.</i>			

# Typical Energy Reduction Targets – SEP Performance Levels

- SEP EI Pathway = 5-15% over 3 years
- SEP Mature Pathway = 15% over 10 years
- DOE Better Plants (Save Energy Now) = 25% over 10 years

The target energy reduction rate is your choice – unless you are getting certified to one of the above.

<http://www.superiorenergyperformance.net/>

<http://energy.gov/eere/amo/better-plants>

# DOE is On-board!

- DOE/SEP EnPI Tool
- DOE's 50001 Ready – Forms & Tasks
- DOE's Energy Footprint Tool (Energy Calculations)

# DOE's 50001 Ready

Tools and Techniques



## Welcome to the 50001 Ready Navigator!

The 50001 Ready Navigator is an online application that provides step-by-step guidance for implementing and maintaining an energy management system in conformance with the ISO 50001 Energy Management System Standard. Join the 12,000+ facilities worldwide benefiting from an energy management system!

### About the Navigator

**Tell Me More**

The 50001 Ready Navigator is an online guide for establishing an energy management system to plan, identify, monitor, and improve energy performance. Completion of the 50001 Ready Navigator provides facilities with verification to the international best practice for energy management systems, ISO 50001.

**What is Energy Management?**

Energy management is a culture for continual improvement of energy performance and efficiency that's integrated within an organization's existing business process. Organizations with an energy management system achieve energy and cost savings through informed decision-making and the implementation of energy-saving practices for business processes, operations and resources. ISO 50001 is the international standard for establishing and maintaining energy management systems.

**Why is Energy Management important?**

Energy is a critical component to your organization's operations. It's important to realize that energy can be managed and controlled in order to best meet your energy management goals to reduce your organization's energy costs, though improved energy performance and consistent use of energy sources and energy-related assets. No matter how large or small your organization, implementing some form of energy management can be a key step to save energy, cut costs, and stay compliant—just see the 1,000+ ISO 50001 certified facilities!

**Why should I use the 50001 Ready Navigator?**

The 50001 Ready Navigator has been developed by the U.S. Department of Energy to assist with the energy management system best practice relative to ISO 50001. Use of the Navigator ensures that your organization shares a common definition of energy management systems, and to create a team-based approach for its implementation. The Navigator is designed to help your organization learn how to achieve all parts of ISO 50001 so that you can set out on being 50001 Ready, or achieve ISO 50001 or business energy performance (BEP) certification.

**What is 50001 Ready?**

50001 Ready is a U.S. Department of Energy designation for facilities and organizations that have implemented an ISO 50001-based energy management system using the guidance in the 50001 Ready Navigator, and that have demonstrated energy performance improvement. To be 50001 Ready designated, organizations are responsible for

- OR -

### Explore the Navigator

**Dashboard**

DOE Recognition Required on 03/24/2019 The DOE should receive energy to your request

100% Completed

**Task Assignments**

Planning

Task	Assigned To	Status	Status Date	Action
1. Scope and Boundaries	First Name Last Name	Completed		
2. Energy Policy	First Name Last Name	Completed		
3. Management Commitment	First Name Last Name	Completed		
4. Energy Team	First Name Last Name	Completed		
5. Legal Requirements	First Name Last Name	Completed		

- OR -

### Create an Account or Log-in to Get Started

EMAIL ADDRESS

ENTER PASSWORD

**Log In**

[Forgot password?](#)

<https://betterbuildingsolutioncenter.energy.gov/50001Ready>

# DOE's 50001 Ready – Tasks & Forms

The screenshot displays the '50001 Ready' Navigator interface. At the top left is the logo for '50001 Ready U.S. DEPARTMENT OF ENERGY'. To its right is a dark blue navigation bar with 'Navigator' in white, and buttons for 'Log In', 'Contact', 'FAQs', and 'Explore'. Below this is a secondary navigation bar with a '+ Create New Project' button and menu items for 'Dashboard', 'Planning', 'Energy Review', 'Continual Improvement', and 'System Management'. The main content area is titled 'Dashboard' and includes links for '← Back to Main', 'Getting Started', and 'About the Navigator →'. A prominent purple banner shows 'OVERALL PROGRESS: 0% Completed'. Below this are four circular progress indicators, each labeled with a phase: 'PLANNING', 'ENERGY REVIEW', 'CONTINUAL IMPROVEMENT', and 'SYSTEM MANAGEMENT', all showing '0%'. At the bottom, a 'Task Assignments' section features a filter bar with 'Planning' selected and other options for 'Energy Review', 'Continual Improvement', and 'System Management'.

# DOE's 50001 Ready – Energy Calculations

DOE Advanced Manufacturing Office				Introduction		HELP		QUESTIONS, COMMENTS, or ISSUES															
Energy Footprint [v1.1]				email: <a href="mailto:eGuidefeedback@ee.doe.gov">eGuidefeedback@ee.doe.gov</a>				Developed for the DOE Advanced Manufacturing Office															
<b>Description</b>																							
The Energy Footprint tracks energy consumption by source, factors affecting to energy consumption, and specific energy uses on a monthly basis for 1 or multiple years.																							
<b>Plant Name</b>																							
<b>Additional Details</b>																							
<b>Worksheets (click to goto)</b>																							
<a href="#">Energy Consumption</a>				<a href="#">Tables</a>		<a href="#">Charts</a>		<a href="#">EC vs RV</a>		<b>First Month</b>													
<a href="#">Relevant Variables</a>				<a href="#">Tables</a>		<a href="#">Charts</a>		<a href="#">Charts</a>		<b>Current Year*</b>													
<a href="#">Energy Uses</a>				<a href="#">Tables</a>		<a href="#">Charts</a>		<b>Number of Years</b>		<b>Jan</b>													
<a href="#">EnPI Table</a>				<a href="#">Table</a>						<b>2015</b>													
										<i>*of first month</i>													
<b>Select Energy Sources</b>																							
<i>Select</i>	<input type="checkbox"/>	<i>Type</i>	<i>Units</i>	<i># Used</i>																			
locked	<input checked="" type="checkbox"/>	Electricity	kWh site	1																			
	<input checked="" type="checkbox"/>	Electricity Demand	kW																				
	<input checked="" type="checkbox"/>	Electricity Fees	none																				
locked	<input checked="" type="checkbox"/>	Natural Gas	Dtherm	1																			
	<input checked="" type="checkbox"/>	LPG	MMBtu																				
	<input type="checkbox"/>	#1 Fuel Oil	MMBtu																				
<b>Select Relevant Variables Tracked</b>																							
<i>Select</i>	<input type="checkbox"/>	<i>Type</i>	<i>Units</i>	<i># Used</i>																			
	<input checked="" type="checkbox"/>	Production	count																				
locked	<input checked="" type="checkbox"/>	Heating Degree Days	HDD	1																			
	<input type="checkbox"/>	Cooling Degree Days	CDD																				
	<input type="checkbox"/>	Customers Served	count																				
	<input type="checkbox"/>	Production Hours	hours																				
	<input type="checkbox"/>	Facility Operating Hours	hours																				
<table border="1"> <tr> <td><b>Main</b></td> <td>Energy Consumption</td> <td>EC Charts</td> <td>Relevant Variables</td> <td>RV Charts</td> <td>EC-RV</td> <td>Energy Uses</td> <td>...</td> <td>+</td> <td>-</td> <td>←</td> <td>→</td> </tr> </table>												<b>Main</b>	Energy Consumption	EC Charts	Relevant Variables	RV Charts	EC-RV	Energy Uses	...	+	-	←	→
<b>Main</b>	Energy Consumption	EC Charts	Relevant Variables	RV Charts	EC-RV	Energy Uses	...	+	-	←	→												

# For more info on DOE 50001 Ready and SEP Programs:

Paul Scheihing  
Technology Manager, Technical Assistance  
Advanced Manufacturing Office  
US Department of Energy  
[paul.scheihing@ee.doe.gov](mailto:paul.scheihing@ee.doe.gov)  
202-586-7234



# Possible Difficulties w/ 50001

- Sub-Metering: Need data on energy use for sub-systems (especially SEUs).
- ISO 50001 may be Repetitive – If your company already manages energy use (has a system for Energy Management) – ISO 50001 EnMS may not add value.
- Auditing Expense – Internal Auditing may be 10-20 days/yr.
- High Upfront Cost – Payback may exceed several years.
- Spreadsheet Expertise
- Historical Perspective

# How Can IES Help You?

- **ISO 50001 Implementation Assistance**
  - Working Sessions to develop EnMS
  - Docs and Form templates
  - Spreadsheet Tools (Lots of Data Crunching)
- Assistance w/ other calcs (measurement and verification calcs, etc.)
- ISO 50001 Auditor Training (1 or 2-day)
- ISO 50001 Overview Training (1-7 hrs.)
- Other Energy Programs Assistance (SEP, Energy Star, DOE Better Plants, etc.)
- ISO 50001 GAP Analysis
- Employee Awareness Training

## Questions?



**Remaining Slides are for Reference**

# ISO 50001 & 50001 SEP Scenario

## Topic 2: Sector Parity and Recognition Levels

### 1. ANAB-Accredited ISO 50001 and 50001 SEP Certification

Organization meets requirements:

1. ISO 50001 EnMS
2. "50001 SEP" Verification:
  - a. ANSI/MSE 50021 requirements
  - b. Energy Performance Improvement:
    - SEnPI > 0.0%

"50001 SEP" VB  
conducts audit, issues  
certificate and submits  
energy performance form to  
50001 SEP Administrator

"50001 SEP" Certified

Aligns with ISO 50001  
energy performance  
improvement requirement

Recognition for performance Levels  
(Silver, Gold, Platinum) offered  
separately by DOE – outside of ANAB-  
accredited "50001 SEP" certification.

# 50001 SEP

## Topic 7: DOE Recognition via Scorecard

DOE recognizes 50001 SEP certified facilities plus offers higher levels of recognition (Silver, Gold, and Platinum) through use of the 50001 SEP Scorecard.

The scorecard is designed to fairly recognize the diverse best practices of varied sectors, size of facilities and length of time in the SEP program.

The scorecard not included ANAB-accredited certification, not required to be audited by SEP Verification Bodies, and no longer a normative reference. Decoupling this recognition from certification offers flexibility and reduces costs.

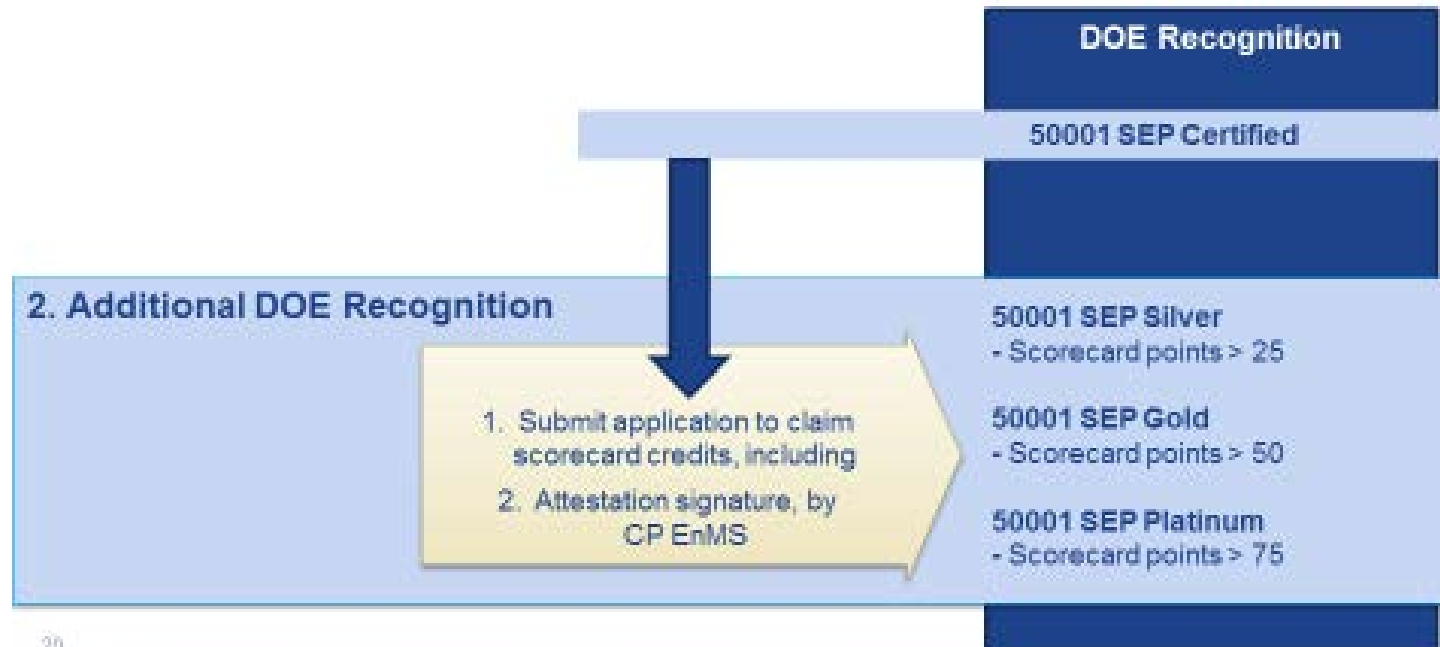
The scorecard encourages energy management best practices and advanced technologies.

Scorecard Credits – SEP 50001	Points
Energy Performance Improvement	33*
Energy Management System	44
• Energy data, monitoring, and measurement	6
• Significant energy uses	12
• Management of energy opportunities	11
• Organizational sustainability	15
Certification, Partnership & Reporting	23
Advanced Energy Technologies	8
Advanced Energy Supply	20

\*Energy performance improvement verified during certification audit is applied to scorecard for points.

# 50001 SEP

## DOE Recognition of Performance Levels



# ISO 50001 Documents and Records (1 of 3)

Element	Procedures	Other Documents	Records	Implied Records	Other Evidence Needed
4.1 General		- Scope & boundaries *			
4.2 Management Responsibility ***					
4.2.1 Top management					- Policy Approval / Defined - Management Rep Appointment - Other reqt's covered throughout the standard (d-j)
4.2.2 Management representative				- EnMS responsibilities & authorities	- Other reqt's covered throughout the standard (a-e, g-h)
4.3 Energy policy				- Energy Policy	- Communication of Policy to organization
4.4 Energy Planning					
4.2.1 General **	- Energy Planning Process - (same as Energy Review Process ??)				
4.4.2 Legal and other requirements				(Legal / Other Req'ts) (3)	- periodic reviews of L/O req'ts
4.4.3 Energy review	Energy Review Method		Energy Review (including items in next column)	- (Current Energy Sources) - (Areas of Significant Energy Users) (4) - [Past and Present Energy Use] - [Future Energy Use] - ( Relevant Variables Affecting SEU) - (Opportunities for Improvement)	
4.4.4 Energy baseline			Energy Baseline		
4.4.5 Energy performance indicators	EnPI Review Methodology			(Energy Performance Indicators)	
4.4.6 Energy objectives, energy targets and energy management action plans		- Energy Objectives and Targets* - Energy Action Plans (**)			

See Excel Sheet

# ISO 50001 Documents and Records (2 of 3)

Element	Procedures	Other Documents	Records	Implied Records	Other Evidence Needed
4.5 Implementation and					
4.5.1 General **					
4.5.2 Competence,			Training Records	(Training Needs)	
4.5.3 Communication		Method for "this" External Communication (wrt	Decision to Communicate Externally		Employee Suggestion Process
4.5.4 Documentation					
4.5.4.1 Documentation requirements		Description of Core Elements (i.e., EnMS Manual)			
4.5.4.2 Control of	Doc Control				
4.5.5 Operational control		- (SEU - Operations and Maintenance Activities Plans/ Controls/Criteria)			Communications of these Op Controls
4.5.6 Design			Equipment Energy Design Performance Considerations (equip,		
4.5.7 Procurement of energy services, products, equipment and energy			Energy Purchasing Specifications	Suppliers Notification of Energy Performance Consideration	Energy Equipment Performance Assessment Criteria
4.6 Checking					
4.6.1 Monitoring, measurement and analysis	Energy Measurement Plan		- results of monitoring "Key Characteristics" - Calibration Data		- Responses to Significant Deviations in Energy Performance - Periodic Review of Energy Measurement Needs
4.6.2 Evaluation of legal requirements and other requirements			Compliance Evaluations		
4.6.3 Internal audit of the EnMS		- Audit Plan - Audit Schedule	Audit Results		
4.6.4 Nonconformities, correction, corrective, and			Corrective / Preventive Actions		
4.6.5 Control of records		Records Controls			



# ISO 50001 Documents and Records (3 of 3)

Element	Procedures	Other Documents	Records	Implied Records	Other Evidence Needed
4.7 Management review					
4.7.1 General			MR Records		Planned Intervals (schedule)
4.7.2 Input to management review					
4.7.3 Output from management review					
<b>TOTALs</b>	6	8	11	13	17
** Docs and Records listed under General may be duplicates from other elements and therefore may not be listed	Procedures = Plans, Procedures, Processes	Other Documents = schedules, policies (docs that are not "procedures")	Records = Record or document	Implied Records = Identify, Evaluate, Analyze, determine, establish, etc	Other Evidence = not necessarily records or implied records
*** Yellow areas are titles only (no text other than titles)	(***) = include facilities, equipment, systems, processes, personnel and other variables				

# Similarities Between 50001 and 14001 (1 of 3)

ISO 50001	ISO 14001		Differences in 50001 from 14001
Element	Element		
4.1 General	4.1	General	
4.2 Management Responsibility ***			
4.2.1 Top management			- 50001 TM required to communicate the importance of energy
4.2.2 Management representative	4.4.1	Resources, Roles, Responsibility and Authority	- 50001 requires the MR to identify person(s) to assist; others
4.3 Energy policy	4.2	Environmental Policy	- 50001 requires commitment of availability of information, necessary resources; supports the purchase of energy efficient products ...
4.4 Energy Planning			
4.4.1 General			
4.4.2 Legal and other requirements	4.3.2	Legal & Other	- 50001 requires the L/O list to be reviewed at planned intervals
4.4.3 Energy review	4.3.1	Environmental Aspects	Very different from 14001 (aspects) -- i.e., - 50001's EnPI is an overall metric - 50001's concept of baseline
4.4.4 Energy baseline			
4.4.5 Energy performance indicators			
4.4.6 Energy objectives, energy targets and energy management action plans	4.3.3	Objectives, Targets & Programs	- 50001 requires statement of performance verification

# Similarities Between 50001 and 14001 (2 of 3)

ISO 50001		ISO 14001		Differences in 50001 from 14001
Element		Element		
4.5 Implementation and operation				
4.5.1 General				
4.5.2 Competence, training and awareness	4.4.2	Competence, Training and Awareness		-50001 training needs are ID'ed for SEUs (14001= all aspects)
4.5.3 Communication	4.4.3	Communication		- 50001 = process for "suggestions" - 50001 = decision to communicate on performance. Others
4.5.4 Documentation				
4.5.4.1 Documentation requirements	4.4.4	Documentation		
4.5.4.2 Control of documents	4.4.5	Control of Documents		- 50001= Control "Technical Documentation", where appropriate
4.5.5 Operational control	4.4.6	Operational Control		- 50001 requires controls in "maintenance" and operations (14001 removed maintenance in 2004) - 50001 = establish criteria (not procedures) - 50001= communicating to personnel working on behalf (instead of supplier and contractors)
	4.4.7	Emergency Preparedness & Response		- 50001 4.5.5 has a Note that states ... when planning for contingencies and emergencies, "may" incorporate energy performance
4.5.6 Design				- not required in 14001
4.5.7 Procurement of energy services, products, equipment and energy				- not required in 14001

# Similarities Between 50001 and 14001 (3 of 3)

ISO 50001		ISO 14001		Differences in 50001 from 14001
Element		Element		
<b>4.6 Checking</b>				
4.6.1 Monitoring, measurement and analysis		4.5.1 Monitoring and Measurement		- 50001 = evaluation of expected vs actual performance - 50001 = Energy Measurement plan - 50001 = investigate & respond to significant deviations in energy performance.
4.6.2 Evaluation of legal requirements and other requirements		4.5.2 Evaluation of Compliance		
4.6.3 Internal audit of the EnMS		4.5.5 Internal Audit		
4.6.4 Nonconformities, correction, corrective, and preventive action		4.5.3 Non-Conformity Corr action & Prev. Actions		- 50001 does not require a CA/PA procedure - 50001 allows "corrections" (not just CA's) -
4.6.5 Control of records		4.5.4 Control of Records		- 50001= not requirements for storage, protection and disposal of records
<b>4.7 Management review</b>				
4.7.1 General		4.6 Management Review		- 50001 MR Inputs to cover projected energy performance - 50001 MR Output to cover changes in allocation of resources
4.7.2 Input to management review				
4.7.3 Output from management review				